WHAT IS CLAIMED IS

1. Process for the hydrogenation of a polymer composed of conjugated diene monomer units and a nitrile group-containing monomer units, in which hydrogenation is carried out in the presence of hydrazine, and an oxidizing compound, wherein the hydrogenation is carried out in the presence of an antioxidant comprising more than 6 carbon atoms and chosen from a derivative of a substituted aromatic alcohol, of dihydroquinoline, of benzimidazole or of an aromatic secondary amine whereby the antioxidant is added to the polymer prior to hydrogenation, with the use of NBR that is polymerized in the presence of an antidegradant being excluded.

2. Process according to claim 1, wherein NBR is used as polymer.

3. Process according to claim 1, wherein the aromatic secondary amine derivative is a p-phenylenediamine derivative.

4. Process according to claim 1, wherein N-isopropyl-N'-phenyl-p-phenylenediamine is used as antioxidant.

5. Process according to claim 1, wherein the hydrogenation is carried out in the presence of a compound which contains an element from group 13 of the periodic system as catalyst, including the use as polymer of NBR that is polymerized in the presence of a polymerizable antidegradant.

6. Process according to claim 1, wherein the hydrogenation is carried out in the presence of a metal ion activator as catalyst.

7. Process according to claim 1, wherein the molar ratio of hydrazine compound/double bonds is between 0.9/1 and 2/1.

8. Process according to claim 1, wherein the molar ratio of oxidizing compound/double bonds is between 0.9/1 and 2/1.

9. Process according to claim 1, wherein the oxidizing compound is added to the reaction mixture after hydrazine.

10. Process according to claim 1, wherein the polymer is present in the latex form.

11. Process according to claim 1, wherein the oxidizing compound is hydrogen peroxide.